

selected for hospital projects. Students were randomly divided into equally sized test and control groups. The control group continued to learn microbiology conventionally. The test group was further divided into smaller groups, which were sent to the hospital for project work. These groups visited wards, operating theatres and laboratories, and also interviewed hospital staff. At least six or seven of these visits were made, each of 1–2 hours duration, according to the amount of time required by each activity to fulfil the objectives. The groups then reported on their visits in class.

Pre- and post-tests to assess knowledge gain were administered to the whole class and compared using *t*-test for statistical significance. Feedback questionnaires, using items scored on a 4-point scale as per Kirkpatrick's evaluation model and measured for internal consistency and validity using Cronbach's  $\alpha$  score, were used to collect faculty staff and student perceptions of the intervention.

**Evaluation of results and impact** Average scores on the pre- and post-tests improved significantly in the project group (from 9.64 to 16.28), compared with the control group (10.12 to 12.50).

Students appreciated the process as it gave them the opportunity to explore the subject of microbiology independently. Overall, 90% of students felt this kind of work would help them perform better in their later clinical practice, but responses were divided when students were asked whether such a project would help them perform better in university examinations. A total of 85% of the students felt the project was feasible for implementation for undergraduates. Generally, students indicated that the hospital visits had made the subject interesting and had helped them to understand the practical significance and relevance of the theory taught in the classroom.

Students acknowledged the project work as highly useful and relevant, but found it difficult to squeeze it into their already busy timetables. They also indicated a need for more motivation and support from hospital staff.

The process of sending undergraduate students on hospital visits in order to strengthen their grasp of important microbiology-related concepts represented a novel idea and was implemented successfully. The effort appears to have resulted in rewards for both teachers and students.

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## Performance-based stratified grouping to enhance peer learning

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**Context and setting** The physiology department in our institute uses small-group discussions in addition to traditional teaching methods to promote active self-learning in students. Students are grouped randomly for these small-group discussions.

**Why the idea was necessary** When the groups are selected randomly, there is often a lack of complete participation by all members of the group. It is common to find that some students do not take part in discussions or that one student dominates the discussion in these groups.

We attempted to resolve these problems by organising the structure of the small groups. Low, medium and high achievers are included in each small group to maintain an effective group session in which all members contribute, thereby optimising small-group interactions and improving students' performance.

**What was done** Using student marks on the First Internal Assessment as the criterion for grouping, 150 students were divided into three groups consisting of low (students with scores of  $\leq 45\%$ ), medium (students with scores of  $> 45\%$  to  $60\%$ ) and high (students with scores of  $> 60\%$ ) achievers, respectively. Each group was subdivided equally into a control and a study group. Smaller groups of six or seven students each were formed in both the study and control groups.

The study groups were selected in a stratified manner, so that each small group of six or seven students included two or three low, two medium and two high achievers. Control group members were selected at random.

For 3–4 weeks, all the groups engaged in a weekly discussion on topics previously specified. One such topic was renal physiology, selected after the traditional didactic lecture. An instructor was assigned to each group in a passive role. The instructor's task was to watch the group at work and to maintain an interaction map.

**Evaluation of results and impact** Renal physiology mean pre- and post-test scores of study group students were  $8.80 \pm 3.02$  and  $9.96 \pm 3.41$ , respectively, indicating an improvement of 13.2%, which was statistically significant ( $t = 2.571$ ;  $P = 0.013$ ). Mean pre- and post-test scores of control group students were  $8.88 \pm 3.41$  and  $9.29 \pm 3.81$ , respectively, indicating an improvement of 4.6%, which was not statistically significant ( $t = 0.802$ ;  $P = 0.426$ ). Evaluation of the

interaction maps showed that students in the study groups participated more actively. Mood in the study groups was generally more upbeat, enthusiastic and positive and featured greater levels of cooperation and interest in learning. However, not all students were seen to actively participate in the control groups and the balance of contribution was not equal in many control groups. The body language of control group students ranged from demonstrating disinterest and passivity to indicating interest.

Students' evaluations of the sessions as assessed by questionnaire showed that the study group students were significantly ( $P = 0.011$ ) more likely to participate actively during discussions. In addition, study group students strongly agreed that the level of discussion was high in their group ( $P = 0.017$ ).

Forming an organised group structure by including low, medium and high achievers in each of the small groups was shown to increase interaction and promote more active student participation and should therefore prove more effective in enhancing learning and improving performance.

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## Using the 'transect walk' as a public health teaching and learning tool

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**Context and setting** In India, a report by national consultants on public health education recommended student-centred, problem-oriented and community-based training for medical undergraduates. However, most medical colleges lack field-based teaching for demonstration and participatory education for undergraduates because of the poor availability of resources.

**Why the idea was necessary** Field visits are arranged for students to give them first-hand understanding of public health problems. Here, the challenge for teachers is to select a field-based participatory teaching tool for field visits of short duration. Conventionally, the 'transect walk' is a qualitative tool and technique which uses participatory research and action. It allows participants to gain a bird's eye view

of the locality and focuses on problem identification and management of local resources. The present study explored the utility of the transect walk as a public health teaching and learning tool for medical undergraduates.

**What was done** A batch of 65 first year medical undergraduates were taken for a transect walk in the village of Pulai, which has a population of 946 inhabitants. This exercise was undertaken as a part of the students' camp curriculum during Social Service Camp, which is held under the National Social Service (NSS) Scheme. Students were divided into 13 small groups. A written checklist on the transect walk was given to each group to help its members retain their focus. The checklist was based on guidelines disseminated by the Institute for Participatory Practices, Patna, India. The self-managed small groups were asked to take a transect walk in the village and to observe the surroundings on a given set of indicators, to encourage villagers to explain things as they progressed on the walk, and to take detailed notes. After 1 hour of the walk, group members summarised their findings in a text report carried out as a piece of group work and shared the various lessons learned with other groups. Content analysis of qualitative data in the form of the text report was undertaken using ATLAS-ti Version 5.0 (Scientific Software Development GmbH, Berlin, Germany). For better validity of the results, two faculty members independently analysed the text data to assess student understanding. Ethical principles were adhered to throughout.

**Evaluation of results and impact** This approach offered active student-centred learning with minimal resources and time requirements. It ensured the interaction of students with villagers on local health problems. Students reported their observations and learning on a wide variety of public health-related topics, such as the power and water supplies to the village, waste disposal systems, sanitation of latrines, housing, kitchen gardens, livestock, use of televisions and telephones, use of alternative sources of energy (solar energy), use of smokeless *chulha* (a stove made from clay), leisure time activities, addictions and religious faith. Students received a quick cross-sectional overview of health problems in the village. Walking together in small groups with local people removed barriers in communications and villagers expressed their views on different aspects of the public health topic more candidly, which does not usually happen in a community meeting or even in a one-to-one interview. Thus, the transect walk can be utilised as a teaching and learning tool for the quick orientation of medical undergraduates to public health issues.